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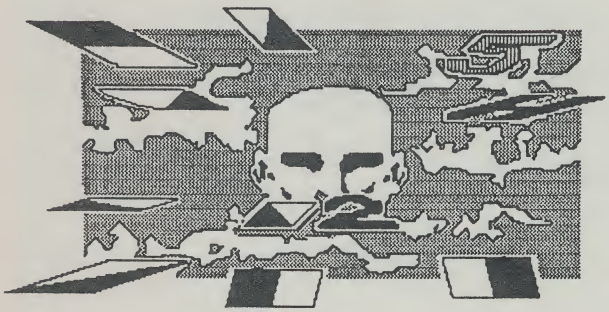
Think Fast



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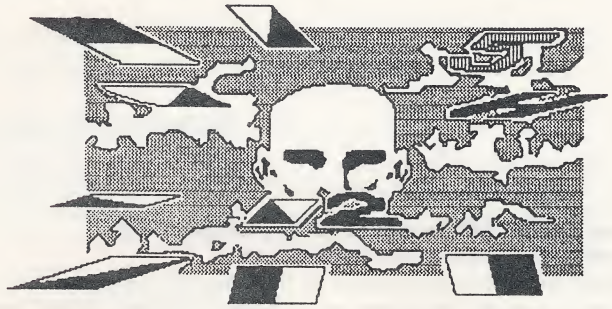
For the 64k Apple II Family

Think Fast



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For the 64k Apple II Family

Acknowledgments

The development of software is a task that requires the participation of many disciplines. The primary design for this program was done by Sherwin Steffin with the programming being coded by Eric Madsen and Christopher Underwood. David Harris served as engineering manager for the project. Joseph Koenka provided much needed engineering consultation and support. William Glynn managed the quality assurance and testing phases of the product with the help of Neil Peretz, Adam Zalesny, Chad Clark, and John Howard.

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Think-Fast is a tool to aid in the analysis and development of memory skills. It also offers fun and challenge! Chapter I of **Think-Fast** documentation gives you all the information you need to run the program and begin improving your memory. Chapter II presents a description of **Think-Fast's** structure. Chapter III of the documentation offers a quick picture of the theory on which **Think-Fast** is based.

OBJECTIVES

Think-Fast has two objectives. The program will help you develop two kinds of memory (recall and recognition) as processed in both the left and right halves of the brain. **Think-Fast** will also provide you with data regarding the capabilities and characteristics of your own memory.

After multiple uses of **Think-Fast**, you will be able to determine measurable improvement in both Recognition and Recall memory. This improvement will be indicated by an increase in your **Think-Fast** scores after adjustments for any changes in the difficulty level of the Sessions have been made.

SYSTEM OVERVIEW

Think-Fast uses a series of timed exercises of increasing complexity and difficulty to test and stretch your memory capacity. The focus of the exercises alternates between the two halves of the brain. When **Think-Fast** senses that you have reached a sufficient level of skill, it begins introducing more complicated memory tasks making the exercises increasingly challenging.

Think-Fast is completely menu driven and can be used by practically anyone to develop memory skills. You set variables controlling the pace of the program to suit your level of ability. Post Session reports offer insight into both your progress in memory training and into the relative performance strength of both your brain's left and right hemispheres.

GETTING STARTED WITH Think Fast

Hardware Requirements

Think-Fast runs on any64k Apple II, II+, IIe, or IIc. Color monitor and joy stick are preferable but by no means necessary. If you have a joystick plugged into your Apple before you boot **Think-Fast**, it will work automatically. (See the section in this chapter titled JOYSTICK OPERATION.) Keyboard controls will work even when a joystick is attached, however. Use whichever you find most comfortable.

Think-Fast requires no special booting procedures. Simply insert the disk in your Apple and turn the computer on. After a few seconds, the **Think-Fast** title page will appear and, after that, the Main Menu.

QUICK-START

If you wish to begin using **Think-Fast** without reading a complete description of the program and its objectives, it is easy to do. Follow the **Quick-Start Set Up** and the **Quick-Start Trials** instructions below. If you want a complete understanding of the program, skip the following section and begin reading the section titled **NEW SESSION — (1).**

Quick—Start Set Up

1. Put your **Think-Fast** disk in the computer and turn the computer on.
2. Select "(1) — New Session" from the Main Menu.
3. Type "Test" and press [RETURN].
4. Do not insert data disk. Press any key to continue.
5. Select "(2) — Medium" from the Speed Menu.
6. Select "(3)" from the Difficulty Menu.
7. Select "(3)" from the Risk Taking Menu.
8. Type in 25 for the Number of Trials and press [RETURN].
9. Type L for Left Brain Start and press [RETURN].
10. Check to make sure all entries are correct.
11. If they are not, answer confirmation question N.
12. Re-enter menu choices.

You can make different menu selections than the ones indicated above once you become familiar with **Think-Fast**. The documentation describes how to adjust your selections to make your Sessions run as you want them to.

Quick—Start Trials

Once you answer the confirmation question Y, you will be presented with a sequence of different types of problems (called Trials). Here as a description of what you will do.

Think-Fast presents you with three types of Trials (or problems): **COMPARE**, **COPY**, and **RECALL**. You will know the type of Trial you are working on by a message box centered at the bottom of the screen.

COMPARE Trials require you to compare the two set of letters, numbers, or pattern blocks on the screen and determine if they are the same or if they are different. The lower part of the screen contains two boxes: one labeled "SAME" and one labeled "DIFFERENT." One of the boxes is highlighted. Change highlighting by pressing the left and the right arrow keys. Enter your answer (whichever box is highlighted) by pressing the [SPACE BAR] or [RETURN].

COPY Trials require you to copy the set of pattern blocks (never letters or numbers) on the left half of the screen into a set of blank boxes on the right half. Copy beginning with the top row of boxes and proceed left to right. Select the box to be copied into the blank set from the row of boxes at the bottom of the screen. Use the left and the right arrow keys to move the square which selects a pattern block. Use the [SPACE BAR] or the [RETURN] key to enter each box you select. Delete mistakes here using either the DELETE or the B key.

The **RECALL** Trials present you with a letter, number, or pattern block set. Memorize the set. When the set disappears from the screen, enter it either by typing letters or by selecting pattern blocks as above.

Occasionally, the Trials you are working on will be interrupted by Overlay Trials. Answer the Overlay, and you will be returned to the Trial you were working on before the interruption. You must answer both the Trial and its Overlay to get the Trial scored as correct.

All Trials are timed by an on-screen clock. You must complete the Trial before the clock runs out, but it is not important how fast you complete the Trial *within the time allowed* by the clock.

When your Session is over, you will see a Summary Report of how you did. Choice 5 on the Reports Menu (which follows the Summary Report) allows you to return to the Main Menu to begin another Session.

The following chart shows you how to select and enter selections, how to correct selections made in error, and how to enter your final answer.

		Indicate Selection	Enter Selection	Correct Entry	Enter Answer
RIGHT BRAIN pattern blocks	Compare	*Keyboard:* Arrow Keys *Joystick:* Up and Down	None	None	*Keyboard:* RETURN SPACE BAR *Joystick:* Button #0
	Copy and Recall	*Keyboard:* Arrow Keys SPACE BAR *Joystick:* Back and Forth	*Keyboard:* RETURN SPACE BAR *Joystick:* Button #0	*Keyboard:* DELETE B key *Joystick:* Button #1	*Keyboard:* RETURN *Joystick:* Button #0
LEFT BRAIN letters and digits	Compare	*Keyboard:* Arrow Keys *Joystick:* Up and Down	None	None	*Keyboard:* RETURN SPACE BAR *Joystick:* Button #0
	Recall	Keyboard	Keyboard	Left Arrow DELETE	RETURN

Keep in mind, a Trial's answer can be made up of several letter, digit, or pattern block selections (4 pattern blocks or a 3 consonant set, for instance). When you have entered the required number of selections, you can then enter them as an answer. Before you do this, you can correct mistakes.

NEW SESSION - (1)

The Main Menu has three choices: "NEW SESSION," "OLD SESSION," and "REPORTS." As indicated on the menu, the choices are activated by typing 1, 2, or 3 respectively. Type 1 to begin a new Session.

First, **Think-Fast** will ask you to type in your name. This is required for Session Reports. Add a suffix to your name to identify specific Sessions (example: Michael 12/9/84). Names and identifying suffixes can total no more than 15 characters. Press [RETURN] after you have typed in your name.

Data Disks

Think-Fast will now tell you to insert a data disk if you wish to use one to store Session Reports. If you are going to use a data disk, replace the **Think-Fast** program disk with a blank or disposable disk. Press any key to continue regardless of whether you are using a data disk or the **Think-Fast** program disk to store your Reports.

Think-Fast will automatically format any disk for use as a data disk. If you are using an old disk, the program will ask you to confirm that you want to destroy the old contents of the disk. A data disk holds approximately 100 Sessions.

The **Think-Fast** program disk will hold approximately 40 Session Report files. Reports can be deleted from both the program disk and data disks creating room for new Session Reports (see the section in this chapter titled Deleting Session Reports).

THE SYSTEM MANAGER

Think-Fast will now prompt you to choose five different variables. These variables make up the **System Manager** which controls the speed, difficulty, and length of your **Think-Fast** session. You can reset the System Manager variables each time you use the program. This lets you adjust them as you become better at **Think-Fast**.

You choose the five System Manager variables one by one from sequential menus. To set the first three variables (Speed, Difficulty and Risk Taking), simply enter the number corresponding to your choice. The program will instantly present you with the next variable to select. The fourth variable (Number of Trials) requires you to press [RETURN] after entering the value you desire (from 1 to 250). Change selections here by backspacing using the back arrow key and retyping before you press [RETURN]. The fifth variable, Left or Right Brain start, responds immediately to an "L" or a "R."

After you have chosen your five System Manager variables, **Think-Fast** will display a chart showing the variables you chose. At the bottom will be a screen prompt asking you to confirm the choices. If you made a mistake, enter "N" and the program will return you to the prompt where you entered your Session name.

Speed

The first System Manager Variable is Speed. For this, **Think-Fast** offers three settings: Fast (1), Medium (2), and Slow (3). These settings control the time available to complete a Trial. Experiment to see which speed is right for you. This System Manager variable lets you challenge your memory skills gradually.

The Speed setting influences your score. Fast Speed (1) multiples your score by 1.5; Medium Speed (2), by 1.25; and Slow Speed (3), by 1.0.

Appendix A shows the relation between **Think-Fast** scores and the Speed Variable.

Difficulty Variable

The second System Manager variable you set is the Difficulty Variable. Choose this variable from a range of 1 through 5 (1 being the most difficult and 5 being the least difficult). This variable is the number of Trials (problems) you must get correct to move up to the next Level of the program, and the number of problems which, answered incorrectly, will move you down a Level in the program. (Levels are described in the section of this chapter titled *Detailed Program Structure*. The Levels in the program are graded in increasing difficulty.)

If, for example, you choose 3 as the Difficulty Variable, when you answer three Trials correctly, you move up a Level. When you miss 3, you move down a Level.

By controlling the number of correct and incorrect answers which advance and slow your progress through **Think-Fast**, the Difficulty Variable determines *how much practice you get at each level.* A Difficulty Variable of 1 is extremely demanding because you get little opportunity to master any level before being advanced to a higher level. Also, you are given no opportunity to practice at a level before being moved down. The easiest Difficulty Variable choice (5) gives you ample opportunity to practice before advancing you to the next higher level.

Correct answers add to your score while incorrect answers subtract from it. Therefore, **Think-Fast** scoring must take into account that users making easier Difficulty Variable selections have more chances to gain points at each Level since they have more Trials (point opportunities) than those who make harder selections. The Difficulty Variable compensates for this by making correct answers worth more for harder Difficulty Variables than for easier ones.

Appendix A shows the relationship between point value and the Difficulty Variable.

Risk Taking Variable

The third System Manager variable you set is the **Risk Taking Variable**. The Risk Taking Variable is chosen from a scale of 1 to 5 (1 being the most risky level and 5 being the least risky).

Correct answers add to your score while incorrect answers subtract from it. The Risk Taking variable allows you to determine *how many* points your correct and incorrect answers will be worth. (There are, therefore, two pre-determined values for each Risk Taking Variable: one for correct answers and one for incorrect answers.) A high Risk Taking setting allows you to earn more points if you are correct, but penalizes you even more points when you are wrong. A low Risk Taking setting gains you only a small number of points for correct answers, but subtracts less than that from your score if you make a mistake.

Appendix A shows the relation between score and the Risk Taking Variable.

Speed, Difficulty, and Risk

The Speed Variable, Difficulty Variable and the Risk Taking Variable interact with each other to determine your Session score. The chart below shows this interaction. The top of the chart shows the Speed Variable and the Difficulty Variable (which determines the point value for each answer). It also shows the Risk Taking Variable's two components: the Variable for correct answers and the Variable for incorrect answers. The bottom of the chart shows how the Variables interact to determine a score. The value of the Speed Variable is multiplied by the Difficulty Variable and the product is multiplied by the appropriate Risk Taking Variable. The final product is multiplied by 100 and is then added to (in the case of correct answers) or subtracted from (in the case of incorrect answers) the total score to derive a new total score.

Number of Trials

Next, set the **Number of Trials** you want in your **Think-Fast** Session. This can be any even number from 1 to 250. If you enter an odd number, the program will add 1 to it to make it even. (This is necessary to get an accurate Left/Right Brain Ratio statistic.)

A Trial is an individual problem or question, and the number of problems you wish to attempt can be influenced by many things: how much time you have to spend with the program, how long your concentrated attention-span is, if you desire to compete against another score which was earned using a certain number of Trials, etc.

Left or Right Brain Start

Finally, determine whether you wish to begin the **Think-Fast** session with a Left Brain or a Right Brain Trial. The Trials alternate throughout each Session between presentations to the Left and Right Hemispheres. This setting controls only which type of problem you wish to *begin* with.

THE TRIALS

There are two categories of memory trainingTrials in **Think-Fast**: those directed to the right hemisphere and those directed to the left hemisphere of the human brain. (We will also refer to the hemispheres as "Right Brain" and "Left Brain.")The Right Brain problems are composed of small, pattern blocks while the Left Brain problems are composed of letters and digits. (Instructions below are for keyboard control. Joystick instructions follow in the section titled **JOY STICK OPERATION**).

Time

Whenever you are answering a Trial, a clock is displayed on-screen. This indicates the time available for the Trial. If you do not complete the Trial before time expires, the Trial is counted as incorrect. There is no bonus for answering a trial quickly. An answer entered immediately counts the same as the same answer entered just before the clock expires.

Right Hemisphere

There are three kinds of Right Hemisphere Trials: **COMPARE**, **COPY**, and **RECALL**. A message box centered at the bottom of the screen tells you at all times during each Session which type of

problem is being presented. After a short while, you will immediately recognize the type of Trial you are working on by the way it looks.

COMPARE

COMPARE shows you two sets of pattern blocks (the sets can be as small as 1 block or as large as 16). A box with the two choices, "SAME" and "DIFFERENT," is centered in the lower half of the screen. "SAME" will be highlighted. By pressing the left or right arrow keys, you can alternate highlighting between "SAME" and "DIFFERENT." Enter your answer (whichever choice is highlighted at the time) by pressing either the [SPACE BAR] or the [RETURN] key.

COPY

The COPY task displays a set of pattern blocks on the left of the screen. On the right is an empty set with the same number of blocks. Along the bottom of the screen is a line of eight different pattern blocks. One of these blocks will have a box around it.

Copy the set on the left into the blank set. Copy the blocks beginning with the top line and move left to right. To copy a pattern block into the blank set, simply use the left and right arrow keys to move the box marking the choices on the row of pattern blocks on the bottom of the screen. When the box is over the pattern that matches the pattern block to be copied, press RETURN or the [SPACE BAR] to activate your selection. The blank blocks fill as you make your choices.

If you make a mistake you can use the [DELETE] or the B key to erase choices. The choices will erase in the reverse order they were made. You will have to refill all the boxes after correcting the mistake. When you press [RETURN] after the last box is selected, **Think-Fast** will accept your answer.

RECALL

The RECALL task shows a set of pattern blocks on the left side of the screen. Concentrate on the pattern set. The clock will not be on screen while you are memorizing the set. When the set disappears, the clock will reappear, and you must recreate the set from memory by selecting pattern blocks at the bottom from the screen (the same way you did in the COPY task).

If you make a mistake you can use the [DELETE] or the B key to erase choices. The choices will erase in the reverse order in which they were made. You will have to refill all the boxes after correcting the mistake. When you press [RETURN] after the last box is selected, the program will accept your answer.

Left Hemisphere

There are two kinds of Left Hemisphere Trials: **COMPARE** and **RECALL**. A message box centered at the bottom of the screen identifies the type of problem being presented. After a short while, you will immediately recognize the type of problem you are working on by the way it looks.

COMPARE

The COMPARE task presents a set of letters or digits in the upper left hand corner of the screen and another in the upper right hand corner. The sets can contain up to 10 letters or digits. Some of the letter sets are words (including incorrectly spelled words) and others merely nonsense sets. A box with the choices "SAME" and "DIFFERENT" is centered on the screen just as it is for Right Brain COMPARE trials. You select your answer (using the right and left arrow keys) and activate it (pressing RETURN or the [SPACE BAR]) the same way as with the Right Brain Trials.

RECALL

The RECALL task shows a set of letters or digits on the left side of the screen. Concentrate on the set. The clock will not be on screen while you are memorizing the set. When the set disappears, the clock will reappear, and you must type the set from memory.

If you make a mistake you can use the [DELETE] key or the back arrow key to erase. The choices will erase in the reverse order in which they were made. You will have to retype all the erased letters or digits after correcting the mistake. When you press [RETURN] after the last letter is selected, the program will accept your answer.

Overlayed Trials

When you are operating **Think-Fast** at an advanced level, it will begin to introduce Overlays. These are interruptions of aTrial by another. When an Overlay occurs, you must answer it first, and then you will be allowed to return to the Trial you were working on when the Overlay occurred. A Left Brain Trial will always be overlayed with one for the Right Brain and vice versa. Overlays are easily recognizable if you are using a color monitor since the screen background changes from blue to red.

You must answer both the Trial and its Overlay to get the Trial counted correct.

ENDING A SESSION

When the Number of Trials chosen in the System Manager has been attempted, your **Think-Fast** session is complete. The Summary Report for the Session will appear on the screen. After seeing the Summary Report, you can choose to have it printed out. You can see the Report later (and print it out) using the Reports choice on the Main Menu. (See the section below entitled **Scoring Report** for a description of the **Think-Fast** reporting system.)

After you have reviewed the Session Summary the program asks you "OUTPUT TO PRINTER?". If you answer N, or after you have printed out your report, the program brings you to the Reports Menu (discussed in full in the section in this chapter entitled **(3) — Reports**. Here you can choose to review Session scores or return to the Main Menu to begin a new or an old Session.

If you wish to stop a Session before you have completed the number of trials you specified in the System Manager, simply press the [ESCAPE] key ***after*** a Trial. This will stop the Session and save the Session records to the point where you stopped. **Think-Fast** will then display a Summary Report of the Session you have just finished. After the Report, the program brings you to the Reports Menu (discussed in full in the section in this chapter entitled **(3) — Reports**). Here you can choose to review Session scores or return to the Main Menu to begin a new or an old Session.

REPORTS - (3)

Main Menu choice 3 brings you to the Reports Menu. The first three choices on the Reports Menu are *(1) — Session Summary, (2) — Session Report,* and *(3) — All Session Summaries.* Each complete Session Summary Report (choice 1) and each Session Report (choice 2) can be reviewed on screen and printed out. Additionally, **Think-Fast** lets you review all Session Summaries (choice 3) stored on disk.

After you have selected the type of report you wish to view, **Think-Fast** will ask you to insert a data disk if that is where the Report you wish to view is saved. Press any key to continue once you have the disk containing the Report in the drive. **Think-Fast** now presents you with a list of all Session Reports stored on that disk. The Session at the top of the list will be in a highlighted bar. You can move the bar by using the left and right arrow keys. (When the highlighting reached the bottom of the screen it will automatically advance to the next Session name.) When the Session for which you want to review scores is highlighted, press the [RETURN] key. If you choose *All Summaries,* the program goes straight to a listing of them without asking for file selection.

After you review the report, the program asks you whether you want to print the report. Simply respond using Y for yes and N for no.

Summary Report

The Summary Report allows you to scan quickly the vital statistics on a **Think-Fast** Session. The first half of the Report contains the following information: the name of the Session, the total Left Brain score, the total Right Brain Score, the total Session score, number of Trials attempted in the Session, and the number of Trials completed correctly in the Session.

The second half of the Summary Report contains the System Manager Variables that were used during the Session (the Speed Variable, Difficulty Variable, the Risk Taking Variable, Number of Trials, and whether the Session began with a Left or a Right Brain Trial.)

Complete Session Report

The Complete Report has two parts. The first part is the Summary Report including the System Manager Variables chosen for the Session. The second part is a flow chart showing each level you operated on, what you did there, and where you went from there.

The complete Session Report is scrolled through using the left (backwards) and the right (forwards) arrows keys. If you press ESCAPE during a Session Report, the OUTPUT TO PRINTER prompt will appear.

The flow chart section of the report is in two columns. The left column represents your progress through the Left Brain Levels and the right column represents your progress through the Right Brain Levels. The top of the columns represent the beginning of the Session.

Each Level report contains the following information: the Level, Number of Trials Correct, the Number of Trials Incorrect, the Time Expired (the number of Trials missed because time expired— a sub-set of the number incorrect), and the Level that you moved to from this Level (you go either up a Level or down a Level depending on how you do). Underneath each information set is information on the next Level that you moved to in that hemisphere.

Deleting Session Reports

Think-Fast will keep track of how much room is available on your disk for storing Session reports. When the disk (program disk or data disk) is almost full, **Think-Fast** will tell you that you are storing the last Session report that will fit on the disk and will ask you to delete old Session Reports before using the disk further. To delete old Session Reports, choose option 4, "Delete a Session," from the Reports Menu. The program will present a list of all Session Reports currently stored on disk. The first Session name on the list will be highlighted. Use the right and the left arrow keys to scroll the highlight bar up and down through the list. When the Session you want to delete is highlighted, press [RETURN].

JOYSTICK OPERATION

If you have a joystick plugged into your Apple, you can use it to control the program. Your joystick must be plugged into the computer before you boot **Think-Fast** for it to work as a program controller. While using the joystick, the keyboard controls will still work.

Moving the stick up and down controls the alternation of the highlighting in the "SAME" or "DIFFERENT" dialogue box during **COMPARE** trials. Moving the stick back and forth controls the selection of pattern blocks for the Right Brain **COPY** and **RECALL** Trials. Button #0 functions as the [RETURN] key for Right Brain Trials.Button #1 provides backspace capability during Right Brain **COPY** and **RECALL** Trials. This lets you backspace in the set allowing you to correct pattern boxes entered by mistake.

While using the joy stick, it it still necessary to enter letters and numbers from the keyboard.

OLD SESSION - (2)

If you select "(2) — Old Session" from the Main Menu, **Think-Fast** tells you that if the old Session you want to restore is saved on a data disk to place the data disk in the drive. **Think-Fast** then displays a listing of all old Sessions currently saved on the disk in the drive. The first Session in the list will be highlighted. Use the left and right arrow keys to move the highlighting up and down the list of Session names. (When you get to the bottom of the screen it will advance to the next Session name automatically.)When the Session you want to restart is highlighted, press [ENTER] and the Session will start again. Before the Session starts, you will then have an opportunity to reset the Number of Trials System Manager Variable. The Number of Trials completed in the first Session and the Number of Trials added in a restart can never exceed 250.

When you restart an old Session, it begins where you ended. Your score statistics are cumulative.

DETAILED PROGRAM STRUCTURE

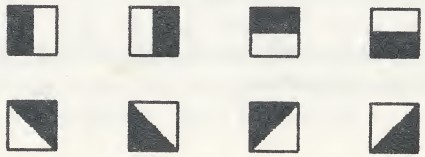
Think-Fast is a carefully planned memory training tool. Since it is also designed to be fun and easy to use, a good deal of what **Think-Fast** does may not be readily apparent to you. This Chapter of the documentation provides you with the master plan of the program. While the following information is not necessary to use **Think-Fast** to improve your memory, it offers a good picture of *what* is going on in the program. **Chapter III: Behind Think-Fast : Theories of Memory** provides information regarding *why* **Think-Fast** is doing what it is doing.

Think-Fast is based on theories of Left and Right Brain specialization (detailed in Chapter III). These theories have as their central tenet that the left and the right hemispheres of the human brain control different aspects of human consciousness. These areas of functional specialization have been determined through experimentation. In general, the Left Brain exerts dominance in the areas of concrete, analytic thought (mathematics, language, logic) and the Right Brain processes abstract, emotional thought (abstract visualization, creative activity, intuitive problem solving).

Think-Fast develops memory capacity in each half of the brain. In so much as the *structure of memory* (discussed in detail in Chapter III) in each half of the brain is the same, **Think-Fast** treats the halves identically. But in so much as the *areas of specialization* are different, **Think-Fast** addresses the two halves with different stimuli.

Right Brain Tasks

The Right Brain (processor of abstract artistic and emotional stimuli) automatically handles the **Think-Fast** memory exercises composed of the set of patterned blocks illustrated below.



COMPARE, COPY, RECALL

The three **Think-Fast** tasks designed to develop memory in the Right Brain are COMPARE, COPY, and RECALL. The COMPARE task presents you with 2 sets of blocks and asks you to determine whether they are same or different. If they are different, they will be different by *only one pattern block*. The COPY task presents a set of blocks and asks you to COPY the set exactly. The original set is available on screen for reference. RECALL presents a set of blocks and asks you to recreate the set *without* recourse to a screen reference.

Right Brain Task Cycle

The three Right Brain tasks repeat in a cycle in the order: COMPARE, COPY, and RECALL. The number of pattern blocks per set increases each cycle. In the first cycle, you COMPARE, COPY, and RECALL sets containing one block. The next cycle uses a 2 x 2 grid of pattern blocks (4 blocks) as the subject of the exercises. The third cycle uses a 3 x 3 grid (9 blocks). The final cycle uses a 4 x 4 grid (16 blocks). Once you have reached this Level, 4 x 4 grids will continue.

The grids of pattern blocks for the Right Brain exercises are randomly generated. There is no possibility of memorizing them through repeated practice. Your challenge is to develop the Right Brain memory skills necessary to process the grids.

Right Brain Levels

Each type of Trial constitutes a Level. Therefore, in the first cycle of Right Brain Trial, there are three Levels. Right Brain Level 1 is COMPARE, Right Brain Level 2 is COPY, and Right Brain Level 3 is RECALL using one block sets. Right Brain Level 4 is comparing one 2 x 2 grid of blocks with another 2 x 2 grid, and so on. There are 15 Right Brain Levels.

Left Brain Tasks

The Left brain, the processor of concrete, analytic thought (mathematics, language, logic), automatically handles the memory exercises composed of letters and digits.

COMPARE and RECALL

The two **Think-Fast** tasks to develop memory in the Left Brain are COMPARE and RECALL. The COMPARE task presents you with 2 sets of letters or 2 sets of digits and asks you to compare the sets and determine whether they are same or different. If they are different, they will only be different *by one letter or digit.* The RECALL task presents you with a set of letters or a set of digits and asks you to recreate the set without recourse to a screen reference.

The Left Brain tasks do not include the COPY task that **Think-Fast** gives the Right Brain. This is because the Left Brain is already well schooled in the art of "chunking" or combining letters (and numbers). This "chunking," when applied to words, is called reading! (Chunking will be discussed in **Chapter III: Behind Think-Fast: Theories of Memory**.) To compensate for the fact that people in a literate society have had considerable Left Brain training, **Think-Fast** accelerates the Left Brain challenge by omitting the COPY task from the Left Brain cycle. Once Left Brain Level 17 is reached and vowel and consonant sets are being used in the Left Brain exercises, misspelled words are used making the Trials more challenging and further compensating for common Left Brain language skills.

Left Brain Task Cycle

The two Left Brain tasks repeat in a cycle in the order: COMPARE and RECALL. Numbers of letters and digits in a set change as the cycles advance. In the first cycle, you must COMPARE and RECALL sets of three consonants to determine whether they are same or different. In the second cycle of tasks, a fourth consonant is added to the sets. This continues through eight cycles until you are comparing sets of 10 consonants.

The next cycle (the ninth) introduces vowels and returns to the three letter stage. The consonant/vowel sets grow in size just as the consonant sets did until, eight cycles later, you are comparing sets of ten letters. The vowel/consonant sets make up correctly and incorrectly spelled words. The incorrect spellings distract you thereby making the memory tasks more challenging.

After the 8 cycles (COMPARE and RECALL) of vowel/consonant sets, the next cycle (the seventeenth) goes back to sets of three members, this time using digits. The digit sets expand to sets of 10

members just as the consonants and the vowel/consonant sets did. There are 24 Left Brain cycles in all.

The letter and digit sets used in the Left brain exercises are randomly generated. There is no possibility of memorizing them through repeated practice. Your challenge is to develop the Left brain memory skills necessary to process the sets.

Left Brain Levels

Each type of Trial constitutes a Level. Therefore, in the first cycle of Left Brain tasks, there are two Levels. Left Brain Level 1 is a COMPARE Trial using three consonant sets, and Left Brain Level 2 is a RECALL Trail using a three consonant set.

Since there are 8 cycles of consonant sets, 8 of vowel/consonant sets, and 8 of digits, there are 24 cycles. Each cycle has 2 types of Trials (COMPARE and RECALL) making 48 types of Trials in all. Each type of Trial constitutes a Level. There are 48 Left Brain Levels.

See Appendix B for a chart listing all the **Think-Fast** Left and Right Brain Levels.

INTERTWINING OF LEVELS

Think-Fast does not develop the memory capability of either brain hemisphere in isolation. The program is designed to constantly alternate training from one side of the brain to the other.

The Left and the Right Brain Levels progress independently of each other. Thus, if you fail on a Left Brain Level, you will be routed to a lower Left Brain Level, but will be able to continue to progress through the Right Brain Level provided you answer those Trials correctly.

The Difficulty Variable (explained in the section in this chapter System Manager Variables) determines how many of each type of Trial you must get correct or incorrect to move up or down to the next **Think-Fast** Level.

Task Overlays

The alternation between the Left and the Right Brain Levels continues unchanging throughout the program. Once Left Brain Level 21 (COMPARE, 5 member vowel/consonant set) or Right Brain Level 8 (COPY, 3 x 3 grid) is reached, **Think-Fast** checks to see if you have answered 75% of the Trials correct. If you are at this Level, the program begins randomly (50% of the time) introducing interrupting task Overlays. The Overlays demand that you stop the memory training task in progress and solve another Trial aimed at the other side of the brain. Thus, Left Brain Trials are always interrupted by Right Brain Trials, and Right Brain Trials are always interrupted by Left Brain Trials.

SYSTEM MANAGER VARIABLES

Think-Fast allows you to set variables determining how fast you wish the program to progress through the Right and Left Brain Levels, and how risky you would like the scoring to be.

When using **Think-Fast** in clinical or diagnostic situations where standardization of scores is required, the effects that the Difficulty Variable and the Risk-Taking Variable have on scores can be negated by *keeping these factors constant.* For the home user, these variable factors allow **Think-Fast** to accommodate the different styles and the skills of many persons.

System Manager variables are crucial to keep **Think-Fast** adjusting to the success or the failure of the user. The function of the Variables is discussed completely in the beginning of this chapter in the section titled **System Manager Variables**.

Chapter I gave you the information necessary to operate **Think-Fast**. This Chapter develops the theories of hemispheric specialization, hemispheric dominance, and memory structure upon which **Think-Fast** is based.

HEMISPHERIC DOMINANCE

Chapter II discussed the areas in which the two hemispheres of the human brain specialize. The following attributes define the Left Brain's area of specialization: verbal; analytical; relational; mathematical; reflective (rather than impulsive); objective based; compartmentalizing; literal; sequential; factual and numerical; and detail oriented. The following are Right Brain attributes: verbally fluent; imaginative; conceptually integrating; impulsive; original; holistic; process oriented (as opposed to content oriented); visual; and highly sensitive to problems.

The two separate brain hemispheres are connected by a band of neural tissue called the Corpus Callosum. This structure is the primary means of communication between the two halves of the brain.

Damage to the Corpus Callosum causes the two halves of the brain to function in virtual isolation from each other. Surprisingly enough, after damage to the Callosum, the ability of each half to function is relatively unimpared. Patients suffering from a severed or damaged Corpus Callosum have two brains functioning independently side by side. Each of the brains adequately processes information based on its specialization, but neither side is able to draw on the information processed by the other. Thus, the behavior of such patients offers one of the best chances to observe the separate functions of each half of the human brain.

In order to observe this discrimination of specialization at work in the human brain, we must understand that information sensed by the left side of the human body (including the senses of touch and sight) is processed in the right hemisphere, and information sensed by the right side of the human body is processed in the left hemisphere. In patients with damaged Corpus Callosii, separated and unconnected memories in the left and the right hemispheres are dependent for information on stimuli processed by the right and left sides of the body respectively (eyes, feet, hands, etc.).

Experiments conducted with these patients are discussed in *"Hemisphere Disconnection and Unity in Conscious Awareness"* by R.W. Sperry. Sperry reports that if a word is flashed very quickly in such a patient's right field of vision (the word is then perceived by the patient's language processing the left hemisphere), the patient can describe the word easily. However, if the word is flashed in the patient's left field of vision (going to the right hemisphere which does not process language well) the person will deny having seen anything. Such denials aside, the patient will almost always be able to pick out an object corresponding to the flashed word from a group of random objects since the right hemisphere processes the stimuli in an abstract, pictorial form. The right hemisphere, while it perceives the flash of information, could not supply the subject with the language skills necessary to describe it verbally.

Patients with damaged Corpus Callosii can easily describe unseen objects held in their right hands. (Remember, the Left Brain——with a facility for language——processes information from the right side of the body.) They cannot, however, describe the same object held in their left hand, and may not even be able to acknowledge holding anything at all. Yet, using the same hand, they can easily pick the object out of a bag of objects. Even after successfully identifying the object using the sense of touch, the patients will insist they have no memory of the object and did not really feel it in the first place. Their ability to talk (the means by which they express their belief that they had never held the object) is controlled by the Left Brain which has no knowledge of what the Right Brain (and the left side of the body) has been doing.

To further demonstrate that the two hemispheres of the brain have different areas of specialization, patients with the damaged Corpus Callosii were shown two different symbols; one in their left field of vision and one in their right. A dollar sign was flashed in the left eye and a question mark in the right. Thus, the left side of the brain (the language processing side) perceived the question mark, and the right side of the brain (the pictorial and abstract processing side) perceived the dollar sign.

If the patient is then asked to draw what he perceived using his left hand (controlled by the Right Brain which perceived the dollar sign) he draws a dollar sign. When asked what he drew, he responds verbally with the information processed in the Left Brain (language oriented). Since the Left Brain perceived the right field of vision, his answer is that he drew a question mark.

Sperry's study of patients with damaged Corpus Callosii is relevant to memory training and **Think-Fast** only as it substantiates the theory that the two hemispheres of the human brain process different types of information. **Think-Fast** takes this into account by using letters and digits to improve verbal memory processing in the left hemisphere and pattern blocks to improve visual memory processing in the right hemisphere. Let us now look at the structure of human memory to see what **Think-Fast** accomplishes in the two hemispheres.

MECHANISMS OF HUMAN MEMORY

The operating mechanism for human memory is similar for both the left and right hemispheres. In fact, the following model of human memory should not be thought of as residing in one or the other of the hemispheres. It appears that memory is spread throughout the brain structure. Long term and short term memory, then, although they are represented in the model as being single, independent storage locations, are actually multiple interconnected areas. The model depicts the relationship between the two major types of memory.

Three stages or types of memory in the currently accepted model of human memory are **Register Memory (RM)**, **Short Term Memory (STM)**, and **Long Term Memory (LTM)**.

Register Memory

Register Memory

Register Memory (RM) is the first interface between the outside stimulus and the brain. RM holds information for anywhere from one to several hundred milliseconds (one to several thousandths of a second). The Central Nervous System scans RM and selects what it perceives to be significant information from it to pass through to short term memory.

RM is best thought of as an subconscious filter which classifies incoming information as either significant (and worth of proceeding on to Short Term Memory) or as insignificant (to be discarded).

Think-Fast does not attempt to develop Register Memory, nor is it clear that the capacity of Register Memory, since this type of memory functions unconsciously, can be developed.

Short Term Memory

Information that passes through RM's screening process goes into Short Term Memory (STM). STM has a capacity that is limited by both time and size. It can hold only seven (plus or minus one) chunks of information, and typically, it can hold any one chunk only 30 seconds unless rehearsal (a conscious effort to maintain the information in memory). A chunk is a unit of information. Different people have differing capacities to chunk information for the purpose of memory storage. See the section **Chunking** in this chapter for an explanation of the concept.

Once in STM, information is either discarded, maintained (via rehearsal), or passed onto long term (permanent) memory storage. Thus, Short Term Memory has aptly been named the "gateway" to Long Term Memory (LTM). Long Term Memory's (LTM) capacity to acquire information is determined to a major degree by the capacity of short term memory. **Think-Fast** focuses on developing STM.

Long Term Memory

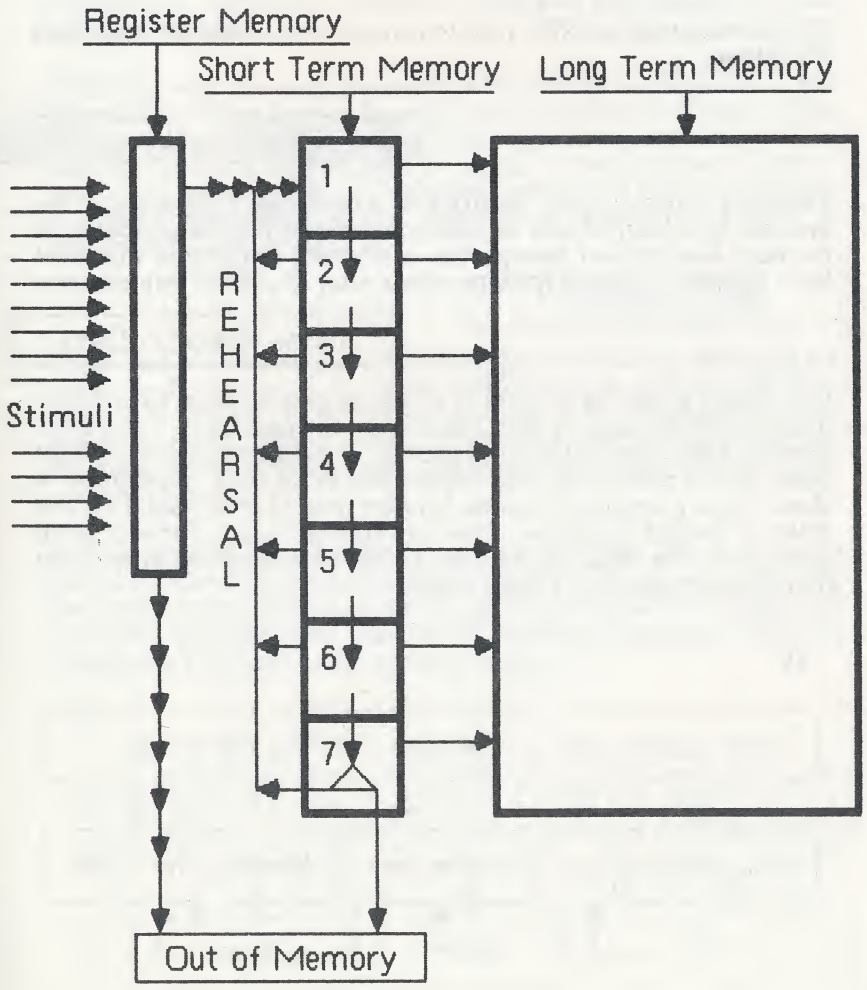
Long Term Memory (LTM) is the memory's permanent storage. LTM appears to be limitless both in capacity and duration. Information processed by STM and passed onto LTM is often not readily accessible——that is, not able to be remembered. Yet, seemingly forgotten information frequently resurfaces (is remembered) in LTM demonstrating that it had indeed been permanently retained, but that the human being could not immediately *locate* and retrieve the information from LTM.

R.M. Shiffrin and R.C. Atkinson's article *"Storage and Retrieval Processes in Long-Term Memory"* describes LTM's storage system as being "self-addressing." This means that characteristics of the stored information determine where it is stored. In the self-addressing storage model, all information storage is governed by a master plan.

This LTM model can be compared to a library. A piece of information about weather patterns in North America might be stored in LTM (as in a library) in a location containing other information about earth sciences in North America. The information may also be stored in several content areas of LTM (just as it might

be cross listed in a library's card catalogue). It might be stored in a location containing general weather facts about the entire world or in a location that contained information about rainfall and agriculture. In all instances, information is stored in LTM based the character of the information and a general LTM master plan.

The following chart shows the sequence through which stimuli passes, the capacity of STM, and STM's ability to retain information through the process of rehearsal.



STM: GATEWAY TO BETTER MEMORY

We know that Register Memory is a passive information filter over which the human consciousness has little, if any, control. Short Term Memory (STM), however, can be controlled and developed by human beings. Since STM processes all information that reaches Long Term Memory (LTM) or permanent storage, the capacity and dexterity of STM will greatly influence the strength of LTM. **Think-Fast** focuses on developing STM.

The primary method STM uses to process information efficiently is Chunking.

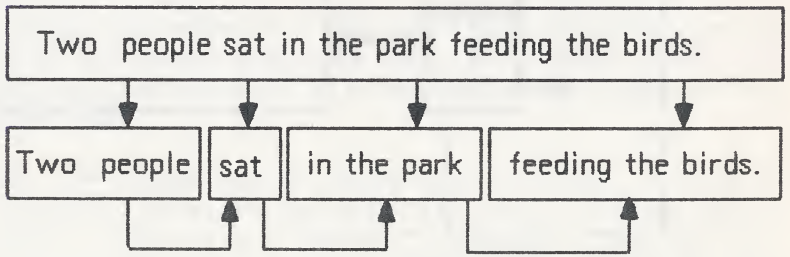
Chunking

Chapters I and II have referred to Chunking. Chunking is the process by which blocks of data are defined for the purposes of memory storage and manipulation. You will remember that STM has a capacity of seven (plus or minus one) chunks of information.

Non–Random Data

Chunking can be the process of grouping **non-random** stimuli into manageable groups. In the case of a set of stimuli that has a strict internal logic, chunking is the process of breaking that stimuli set down into smaller *but interrelated* pieces of data. Illustration A shows how a sentence can be broken into chunks based on the rules of English grammar. Due to internal logic of the original stimuli set, the resulting chunks all contain cues which connect them to each other in a strict order.

A.



People have varying capacities for chunking non-random data in STM based on previous learning. An automobile mechanic, for example, might perceive an engine as three major parts (or chunks): the engine block, the ignition system, and the cooling system. Someone without a mechanic's training sees the same engine as hundreds of different wires, hoses, housings, etc. Such a novice would have to process these as hundreds of chunks of data in STM to remember the engine or to be able to distinguish it from another engine.

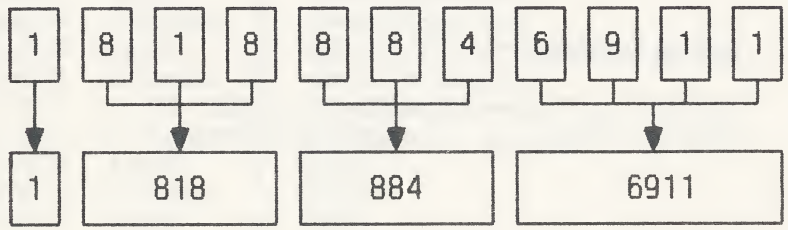
Think-Fast will develop chunking skills for non-random data, but these skills will be limited by each individuals base of knowledge. Most people readily understand the English language and have at least an intuitive knowledge of syntax. Development of non-random chunking skills will help them cope with such varied tasks as poetry memorization or memorizing procedures (such as cooking or word processing).

Random Data

Think-Fast also develops a different type of chunking. This type is a generalizable capacity to chunk random data with no aid from previous learning. Such chunking helps one remember codes, phone numbers, license plates, directions (verbal or pictorial), etc. It is this skill which determines, in general, whether or not you have a good memory.

An example of random data chunking is trying to remember a phone number. In such a case, chunking is the process of organizing the random stimuli into sets which can be processed as a single unit or as several single units. Illustration B below shows how chunking transforms 11 random digits into 4 chunks.

B.



Appendix A

Speed Variable Values

Menu Choice	Scoring Factor
1 (Fast)	1.5
2 (Medium)	1.25
3 (Slow)	1.0

Difficulty Variable Values

Menu Choice	Scoring Factor
1 (Most Difficult)	3
2	1.5
3	1.0
4	.75
5 (Least Difficult)	.6

Risk Taking Variables

Menu Choice	Scoring Factors	
	Correct	Incorrect
1 (Most Risky)	5	6
2	4	4
3	3	2
4	2	.75
5 (Least Risky)	1	.25

Scoring Formulae

Correct: Total Score + (SV)×(DV)×(RTC)×(100)
Incorrect: Total Score – (SV)×(DV)×(RTI)×(100)

Appendix B

Think-Fast Chart of Levels

	Left Brain			Right Brain	
Level 1	Compare	3	Consonants	Compare	1x1
Level 2	Recall	3	Consonants	Copy	1x1
Level 3	Compare	4	Consonants	Recall	1x1
Level 4	Recall	4	Consonants	Compare	2x2
Level 5	Compare	5	Consonants	Copy	2x2
Level 6	Recall	5	Consonants	Recall	2x2
Level 7	Compare	6	Consonants	Compare	3x3
Level 8	Recall	6	Consonants	Copy	3x3
Level 9	Compare	7	Consonants	Recall	3x3
Level 10	Recall	7	Consonants	Compare	4x4
Level 11	Compare	8	Consonants	Copy	4x4
Level 12	Recall	8	Consonants	Recall	4x4
Level 13	Compare	9	Consonants	Compare	5x5
Level 14	Recall	9	Consonants	Copy	5x5
Level 15	Compare	10	Consonants	Recall	5x5
Level 16	Recall	10	Consonants		
Level 17	Compare	3	Vowel/Consonants		
Level 18	Recall	3	Vowel/Consonants		
Level 19	Compare	4	Vowel/Consonants		
Level 20	Recall	4	Vowel/Consonants		
Level 21	Compare	5	Vowel/Consonants		
Level 22	Recall	5	Vowel/Consonants		
Level 23	Compare	6	Vowel/Consonants		
Level 24	Recall	6	Vowel/Consonants		
Level 25	Compare	7	Vowel/Consonants		
Level 26	Recall	7	Vowel/Consonants		
Level 27	Compare	8	Vowel/Consonants		
Level 28	Recall	8	Vowel/Consonants		
Level 29	Compare	9	Vowel/Consonants		
Level 30	Recall	9	Vowel/Consonants		
Level 31	Compare	10	Vowel/Consonants		
Level 32	Recall	10	Vowel/Consonants		
Level 33	Compare	3	Digits		
Level 34	Recall	3	Digits		
Level 35	Compare	4	Digits		
Level 36	Recall	4	Digits		

Appendix B

Level 37	Compare	5	Digits
Level 38	Recall	5	Digits
Level 39	Compare	6	Digits
Level 40	Recall	6	Digits
Level 41	Compare	7	Digits
Level 42	Recall	7	Digits
Level 43	Compare	8	Digits
Level 44	Recall	8	Digits
Level 45	Compare	9	Digits
Level 46	Recall	9	Digits
Level 47	Compare	10	Digits
Level 48	Recall	10	Digits

WARRANTY

BrainPower, Inc. warrants all of its products to be free of operating defects, whether caused by media failure or program error. Should you find an error which you believe to be caused by a failure of the media or the program, you should return the disk for replacement along with a written description of the problem to **BrainPower, Inc., 24009 Ventura Blvd., Suite. 250, Calabasas, CA 91302**. Media failures occuring less than ninety (90) days after purchase will be replaced at no charge. Those occuring after this period, or submitted without proof of purchase will have a service charge of $10.00 plus shipping and handling. Programming defects that are verified by **BrainPower** will be corrected and the program returned to you at no charge. This lifetime programming warranty shall remain in effect, so long as this product is being sold. Should **BrainPower** be unable to correct the error after a reasonable period of time, you will be entitled to a full refund of the original purchase price.

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